

The Effects of Brain Gym® Activities and Traditional Teaching Strategies on Students'
Performance in Comprehension in a 4th Grade Classroom

Patrick N. Kariuki

And

Holly D. Kent

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Abstract

The purpose of this study was to examine the difference between students' scores in comprehension (English Language Arts) tests when they are led in Brain Gym® activities before class instruction and when they are taught using traditional teaching strategies. The sample for this study consisted of 11 males and 9 females. Data were collected by using Pearson Reading Comprehension tests. The students were tested after five days of receiving traditional teaching strategies and again after five days of participating in Brain Gym® activities before class instruction began. Data were analyzed using a paired t-test. The results indicated a significant difference in students' comprehension test scores when taught using Brain Gym® activities over the students' comprehension test scores who were taught using only traditional teaching strategies $t(19) = -5.461, P = .001$. However, there was no significant difference between genders on performance. The results suggest that implementing Brain Gym® activities before instruction significantly influences comprehension scores; therefore, teachers are encouraged to use Brain Gym® activities to help improve their students' comprehension scores.

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Introduction

In 2000, the National Reading Panel (NRP) issued a report that identified five areas that they found critical for effective reading instruction: phonemic awareness, phonics, fluency, vocabulary, and comprehension (“Five Essential Elements of Literacy”, 2013). However, out of the five, comprehension has been considered an area where students tend to struggle the most (Koester, 2012). There are many reasons a student may be having trouble with comprehension. If a student is having problems with other literacy constructs, for example word recognition, decoding, fluency, etc., they will most likely have issues with comprehension (Trahan, 2004). Problems in those areas will cause students to focus on trying to figure out individual words rather than being able to gain meaning from texts. Students have to realize that meaning from a text goes beyond meaning of individual words. Comprehension also goes beyond reading fluently and recognizing words, so having these skills doesn’t guarantee comprehension of a text (Trahan, 2004). Teachers have to look beyond test scores to be able to determine where a child is having problems in comprehension. Theoretically, if students are having trouble with comprehension skills, they will begin to lose focus and give up on reading all together (Koester, 2012).

With the focus on comprehension skills, educators are also concerned with how to reach struggling readers. Classroom teachers have frequently sought multiple ways to reach their struggling students. Recent research in teaching strategies has identified differentiation as a commonly used teaching strategy among effective teachers. As Roe (2010) indicated, differentiation is modified teaching instruction that helps students with

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different educational needs and learning styles to meet and master challenging academic content. According to research, students were more successful when they were taught based on their readiness, learning profiles, and interests (Tomlinson, 2004).

Reaching struggling readers paired with quality instruction benefits students' comprehension skills. Quality instruction should incorporate movement into the learning process. There are cognitive benefits associated with physical activity, including improved memory, concentration, attention, and academic performance (Hannaford, 1995). During the 1960s, Dennison began conducting research into literacy achievement and its relation to brain development that would form the basis for the Brain Gym® work - the remarkable movement-based learning program that has helped people of all ages turn their learning academic challenges into successes (Hannaford, 1995). Through Brain Gym® activities, Hannaford offered clear alternatives and remedies that people can put into practice right away to make a real difference in their students' ability to learn. Hannaford, who examined the role movement played in learning from infancy through adulthood, concluded that movement is crucial to learning. After completing her research, she determined using Brain Gym activities in the classroom would help students' comprehension greatly (Hannaford, 1995). The Brain Gym® International Foundation also developed a unique program of physical activities that synchronizes body and mind to enhance learning and achievement for people of all ages and abilities (Carpenter, 2005). This program has seen rapid and often dramatic improvements in focus, comprehension, communication, organization and physical movement (Bourne, 2000).

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Review of Literature

Literacy

Literacy, in its simplest definition, is the ability to read and write. The antonym to literacy is illiteracy, the inability to read and write. Traditionally, these two terms were used to discuss a person's ability to create or interpret the printed word. Literacy is sometimes divided up into levels. The English literature scholar, for example, would be said to have a high level of literacy. An adult who ended his education in the fourth grade and did not study outside of school would most likely have a low level of literacy. It is very common for a student to be categorized by his or her literacy level or "reading level."

Educators have created systems through which they can grade and rank students based on their literacy rate. Using such a program, school systems hope to track how the literacy of their students progresses over the years of their education. These tests often help teachers and school administrators to detect the students who are excelling and might need to be placed in a more advanced class, and those who are not meeting the benchmark and therefore might need to take a remedial reading course.

It is widely accepted that literacy is a crucial skill to have. Most people who are able to read take the skill for granted, almost as though it were a natural ability. This is especially true for people who learned to read at a young age. However, being illiterate in the modern world can be rather hazardous. If a person does not know how to read, it is impossible to review a document before signing it, fill out a job application, interpret a standard map, read the ingredients on a package of food or medicine, or understand

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caution signs. These are just a few instances in which literacy is crucial (Freeman, 1998).

With the current shift toward Common Core Standards, educators and administrators are placing an emphasis for each student to be college and career ready. One way to ensure that is to provide every student quality instruction in literacy. There are five aspects to the process of literacy: phonics, phonemic awareness, vocabulary, reading comprehension and fluency. These five aspects work together to create the reading experience. As children learn to read they must develop skills in all five of these areas in order to become successful readers (Freeman, 1998).

The Comprehension Aspect

Out of the five literacy components, comprehension has been considered an area where students tend to struggle the most (Freeman, 1998). There are many reasons a student may be having trouble with comprehension. If a student is having problems with other literacy constructs, for example word recognition, decoding, fluency, etc., they will most likely have issues with comprehension (Freeman, 1998). Problems in those areas will cause students to focus on trying to figure out individual words rather than being able to gain meaning from texts. Students have to realize that meaning from a text goes beyond meaning of individual words. Comprehension also goes beyond reading fluently and recognizing words, so having these skills doesn't guarantee comprehension of a text (Freeman, 1998).

But what is comprehension? Comprehension is what most people think reading is. Comprehension is the main reason why we read. It is the aspect of reading that all of the others serve to create. Reading comprehension is ability to understand what a

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text is all about. It is more than just understanding words in isolation. It is putting them together and using prior knowledge to develop meaning (Harvey & Goudvis, 2000).

Reading comprehension is the most complex aspect of reading. It not only involves all of the other four aspects of reading; fluency, phonics, phonemic awareness, and vocabulary, it also requires the reader to draw upon general thinking skills (Harvey & Goudvis, 2000). When a reader is actively engaged with a text, the reader is asking and answering questions about the story and summarizing what they have read. Like vocabulary, reading comprehension skills develop and improve over time through instruction and practice (Harvey & Goudvis, 2000). Educators concluded that our children could not progress as readers until they understood that reading was a meaning-making process (Stephens, Cox, Downs, Goforth, & Jaegar, 2012).

Traditional Teaching Strategies

Prior to the 1970s, the process of reading comprehension was viewed as the reader's ability to restate the text (Brooks, 2004). Historical teaching strategies include worksheets, which did not engage students, resulting in not much being gained by these activities (Brownell, 2000). It is known that skillful readers use prior knowledge, make connections, visualize, infer, ask questions, determine importance, and synthesize the materials that they read (Grimes, 2004). As the amount of background knowledge concerning a text increases, the ability to comprehend the text correlates (Pardo, 2004). When skillful readers use their schema, their known information is integrated with their new information through a series of connections (Pardo, 2004). Skillful readers verify that what they are reading makes sense and if not use strategies to comprehend the text when it stops making sense (Pardo, 2004). Struggling readers need to be taught to

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fix their reading when it does not make sense. Teachers need to provide explicit instruction in using reading strategies. It is imperative that teachers “show not tell” how skillful readers read.

Many different methods can be utilized to reach learners. The use of graphic organizers can help aid students in making sense of information. Giving students tasks that will allow them to represent their learning in various ways helps them to make a connection to the task and make it their own. Giving a student choices in their learning will allow for exploration of different methods, and will help them to decide what will work for them (Dotger & Causton-Theoharis, 2010). Therefore, offering different choices to students increases motivation and ownership.

Students who are given choices in how they show their knowledge leads to enrichment and understanding of content. These choices that once were reserved for gifted students are thus available to all children (Beecher & Sweeny, 2008). By giving choices, students can feel ownership for their own learning and explore further information in areas where they might be interested. Thus using this concept turns the table from the teacher defining projects or work, to the teacher being a support, and a guide for the student in their own endeavor to understanding. The teacher is viewed as more of a facilitator to student learning and the students become independent learners (Beecher & Sweeny, 2008). Teachers, who brought in storytellers and reading mentors, saw an improvement in students' comprehension and achievement scores. Greater interest and willingness to explore books was also a result (Beecher & Sweeny, 2008).

In order for any teaching strategy to be successful, it is important for the teacher to know their students and know what their weaknesses, strengths, and needs are.

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One way to understand what kind of differentiation or teaching style that a student might need is by giving an interest inventory. This will show the child's interests and reveal their individual learning style. This information is crucial to knowing what activities the student will best respond to. Using this technique of instruction will help to maximize growth by meeting needs and helping to reaching higher levels of understanding (Beecher & Sweeny, 2008). Embracing student differences, using assessment to steer instruction, and giving students choices that will engage and motivate them are only a few effective teaching strategies (Beecher & Sweeny, 2008).

The method of teaching where the teacher instructs the class as a whole and the students sit and take notes is becoming a thing of the past and is not as efficient as it once was in today's classroom where diversity and differing learning styles are dominant (George, 2005),

Introduction of Brain Gym® Activities

While traditional teaching strategies have been proven to be effective in the past, educators and researchers also believe they would be more effective working with other educational programs rather than working alone (Ritchey, Silverman, Montanaro, Speece, & Schatschneider, 2012). For years, learning is believed to have been the culmination of a student's ability to process information to make sound decisions. However, some believe learning to be the emphasis on basic developmental movement patterns that will enhance neurological function (Goldberg, 2009). Each of us has a foundation of neurological patterns that allow us to continually learn and grow. If the foundation is lacking or weak we then must go back and reinforce learning at this level of primitive reflexes or developmental movement patterns (Goldberg, 2009).

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Hannaford, an advocate of movement and play in learning, discusses the importance of sensorimotor development (visual, auditory, tactile, and kinesthetic readiness) to the learning process (Hannaford, 2005). In *Smart Moves*, Carla Hannaford describes how emotions and the physiological stress reaction can affect the everyday lives of both children and adults (Hannaford, 2005). She invents the term SOSOH (Stressed Out, Survival-Oriented Humans) for people with learning disabilities or attention difficulties (Hannaford, 2005). She argues that ADD, ADHD, and all other learning problems are related to stress, as stress produces survival-oriented behavior while inhibiting the learning process (Hannaford, 2005). *Smart Moves* proposes approaches to support learning, including a) dietary awareness: drinking enough water, less sugar intake, etc., b) doing physical movement to help the brain perceive events in a less stressful way and c) creating a more calm environment for people with learning difficulties (Hannaford, 2005). She provides several case examples of children whose learning improved remarkably through use of the Brain Gym® activities, as well as including her own research done with Brain Gym®.

What is Brain Gym®?

The brain is made up of two hemispheres that are responsible for different functions. When the right and left hemispheres are communicating competently, we experience integrated thought related to higher level thinking, problem-solving and creativity. When we are under stress, our brain functioning becomes unbalanced. In addition, when under stress, depending on whether we are right or left-brain dominant, we will experience symptoms such as losing the ability to reason well, reduced joy, reduced understanding, reduced comprehension, increased mechanical response,

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increased insensitivity, feelings of overwhelm, difficulty expressing , difficulty remembering details, increased emotional response or an appearance of being “spaced out” (Dennison & Dennison, 1992).

There are many strategies to promote brain integration, however without proper attention to stress reduction, the strategies might not work or will not work to their maximum potential. Dennison is a professional educator, a pioneer in the field of kinesiology, and an authority on the breakthrough attainment of cognitive and academic skills (Dennison & Dennison, 1992). In the 1960s, Dennison began the seminal research into reading achievement and its relation to brain development that would form the basis for the Brain Gym® work - the remarkable movement-based learning program that has helped people of all ages turn their learning challenges into successes (Dennison & Dennison, 1992). Working alongside developmental optometrists, Dennison offered his students a full program in sensory development, including a few simple movements that seemed to help with equilibrium and perceptual skills. These movements would someday spark the idea for Brain Gym® (Dennison & Dennison, 1992).

Brain Gym® movements, exercises, or activities refer to the original 26 Brain Gym movements, sometimes abbreviated as the 26. These activities recall the movements naturally done during the first years of life when learning to coordinate the eyes, ears, hands, and whole body. The twenty-six activities, along with a program for “learning through movement” where interdependence of movement, cognition, and applied learning is the basis, bring about tremendous results in brain based learning

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(Dennison & Dennison, 1992). Clients, teachers, and students have been reporting for over 20 years on the effectiveness of these simple activities.

Even though it is not clear yet "why" these movements work so well, they often bring about dramatic improvements in areas such as a) concentration and focus, b) memory, c) academics, d) physical coordination, e) relationships, f) self-responsibility, g) organization skills, and h) attitude (Dennison & Dennison, 1992). Many of the Brain Gym® activities, such as the Owl, the Elephant, and Alphabet 8s, were developed from Dennison's knowledge of the relationship of movement to perception and the impact of these on fine-motor and academic skills (Koester, 2012). Others were learned during his training as a marathon runner, his work with developmental optometrists doing vision training, and his study of Jin Shin Jitsu (a form of acupressure) (Koester, 2012). Dennison's Laterality Repatterning and Three Dimension Repatterning are Paul's original contributions to the field of education (Koester, 2012). Today the work is carried on by the International Faculty, each of whom is licensed by Brain Gym® International (Koester, 2012). This program has seen rapid and often dramatic improvements in focus, comprehension, communication, organization and physical movement (Koester, 2012).

What does the research say?

In 2004, students engaged in Action Based Learning activities such as Brain Gym® to improve memory retention, reinforce academic concepts, balance brain chemicals while experiencing whole-brain, whole-body learning (Trahan, 2004). Educational research suggests that about 85% of school age students are predominantly kinesthetic learners (Trahan, 2004). The concepts in the Action Based

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Learning Lab are based on the brain research that supports the link of movement and physical activity to increased academic performance and the use of Brain Gym® activities (Trahan, 2004). The Action Based Learning™ Lab along with Brain Gym® targets the young developing brain ages 4-7 years. However, the Action Based Learning™ Lab benefits all students for remediation and enrichment (Trahan, 2004).

Brain science strongly supports the link of movement to learning. The brain and body's movement and learning systems are interdependent and interactive. For example, motor development provides the framework that the brain uses to sequence the patterns needed for academic concepts (Trahan, 2004). The body's vestibular system controls balance and spatial awareness and facilitates the students' ability to place words and letters on a page (Trahan, 2004). When a student walks or crawls on the ABC Pathways mat in specific patterns, the brain's ability to encode symbols is increased. The four visual fields needed for eye tracking is strengthened. Proper development and remediation of these systems are critical to a child's ability to learn (Trahan, 2004).

Potter set out to study the effect of Brain Gym on reading achievement for grades three through five (Potter, 2003). This study explored whether an intervention involving Brain Gym exercises designed to increase academic achievement in the areas of math and reading/language arts would be successful. Three groups were used in the study: an initial treatment group, a delayed treatment group, and a control group. Each of the three groups was comprised of 20 fifth-grade students (Potter, 2003). Students' ThinkLink global proficiency scores in math and reading/language arts were used as the measure of academic achievement. It was hypothesized that students in the initial and

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delayed treatment groups would demonstrate higher math and reading/language arts academic achievement as compared to students in the control group. These hypotheses were not supported. There were no significant differences in math or reading/language arts academic achievement among the three groups (Potter, 2003). This study further explored whether students in the initial treatment group would continue to engage in Brain Gym® exercises once the researcher was no longer directly monitoring their participation. It was hypothesized that students in this group would self-initiate Brain Gym® exercises at least 75% of the time. This hypothesis was supported (Potter, 2003). However, there was a significant difference between the percentage of students' self-initiation of Brain Gym® exercises in their morning and afternoon classes. Potential reasons underlying these differential rates of self-initiation are explored. One conclusion that can be drawn from this study is that Brain Gym® exercises are ineffective in increasing the math or reading/language arts academic achievement of fifth-grade students (Potter, 2003). However, the results of this study are in contrast with available research involving Brain Gym® exercises and academic achievement (Potter, 2003). Further research is needed to determine whether Brain Gym® exercises are more effective with students who have some form of learning challenge or disability and less effective with students who are academically average or above average in ability. Additional issues that may have impacted the results of this study are explored and recommendations for further research are presented (Potter, 2003).

Bourne set out to conduct an exploratory correlation research study to determine if students who engaged in exercises designed to increase left and right brain hemisphere connections would score higher on identical tests than those who did not

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perform the exercises (Bourne, 2004). Because the 2001 No Child Left Behind Act requires students to reach benchmarks of academic achievement, teachers need additional ways to help students process and assimilate information more effectively and efficiently to earn acceptable scores on end-of-course tests. The research question involved understanding whether students who participated in physical activities that engaged both sides of the brain would achieve higher scores on the same tests than those who did not participate in the exercises (Bourne, 2004). A constructivist theoretical approach provided the framework for this study. The scores for treatment and comparison group were compared using an independent samples test. Findings indicated that scores of those who engaged in physical activities each day before class achieved higher communication arts scores than those who did not (Bourne, 2004). Implications for social change include increased academic achievement and greater school success.

Twelve teachers of grades K, 2, 3, 4 and 5 were given Brain Gym® instruction every Monday after school for one hour throughout the school year. In these sessions, they learned how to determine which Brain Gym® movements and activities were called for in relation to various academic situations and how to guide the students in doing them (Carpenter, 2005). The teachers then taught the children in their classes how to determine for themselves which Brain Gym® movements they would benefit from at any time. The children became quite self-sufficient in the use of Brain Gym® movements to help them be more productive in any of their academic subjects (Carpenter, 2005). Each participating classroom did a minimum of 15 minutes of Brain Gym® per day. The teachers also did classroom presentations as well as one-on-one instruction (October

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through January) with children who were having the most difficulties in school (Carpenter, 2005).

The study was based on the children's reading scores on the Stanford 9 test, a standardized achievement test given to all children in grades 2 through 11 in California (Carpenter, 2005). It compared the children's reading percentile scores from May 98 (the end of the previous school year), to those of May 99 (the end of the "Brain Gym®" school year) (Carpenter, 2005).

The results were impressive both statistically and academically. The "Brain Gym® group" children made almost double the reading improvement of the children in the non-Brain Gym® groups (Carpenter, 2005). Carpenter is quick to point out that gaining percentile points on reading scores is only one indicator of the improvement that the children made through their use of Brain Gym® (albeit the most easily measured one) (Carpenter, 2005). Not so easy to measure, but clearly evident to the participating teachers, children, parents and school administrators, was the shift in self-esteem and attitude toward school that came along with the children's developing abilities. One portion of the study is filled with comments from children who were amazed to be learning more easily, teachers who were more energized and effective in the classroom, and parents who were grateful and delighted in the growth they were seeing in their children (Carpenter, 2005).

Conclusion

Students are ranked throughout the nation by their level of literacy; the ability to read and write. Literacy has been broken down into five components: phonics, phonemic awareness, comprehension, vocabulary, and fluency. Of the five

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components of literacy, teachers report the most crucial area they find readers struggling with is comprehension. Efforts have been made on federal and state levels to help teachers identify struggling readers. However, traditional teaching strategies, in most cases, have proven not to be effective alone. Shifts have been made to reach every student. 85% of students are predominantly kinesthetic learners. Brain Gym® is a movement based learning program that has helped people of all ages turn their learning challenges into successes. Therefore, would traditional teaching strategies be more effective if activities such as Brain Gym® were administered together to improve comprehension?

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Methodology and Procedures

This research study took place in a public elementary school in Northeast Tennessee. The school had 526 students enrolled and 90.5% of these students were eligible for the reduced or free lunch program. 67.3% were White; 22.4% were Black, non-Hispanic; 9.9% were Hispanic; and <1% was of Asian/Pacific Island descent.

The sample for this study consisted of one fourth grade class of 20 students. Ten students were Caucasian, nine were Black, and one was Asian. The ability levels of the class were varied, but developmentally on schedule. The class comprised of 9 and 10 year olds. One of the students had an Autism Spectrum Disorder, but was high functioning. 11 of the students were female; 9 were male.

Data for this study were collected using the Pearson Reading Comprehension Test for the fourth grade. The Pearson Reading Comprehension test consists of 10 questions stemming from the weekly reading story. Each question builds in difficulty to the next giving a representation of the student's comprehension of the story. Each student's results included two scores from the Pearson Reading Comprehension Test; one score from the unit taught with traditional teaching strategies and the other from the unit where Brain Gym® activities were led before instruction.

Procedure

Before the study began, permission was sought from the school principal, Dr. Roger Walk. Permission forms were then sent to the parents of the students to participate in the study. Permission was also sought from Milligan College's Institutional Review Board. After permission was granted, the sample was selected. The entire

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class was taught unit one with traditional teaching strategies. Then, the class took the Pearson Reading Comprehension Test for the unit. Next, the class was taught unit two, but was led in Brain Gym® activities before the instruction began. On unit two test day, the students were also led in the same Brain Gym® activities before the Pearson Reading Comprehension Test was administered. The results from the two tests were then compared. The two units taught were similar in comprehension and difficulty levels.

Results

Three research questions were addressed in this study.

- Research question # 1: Is there a difference between students' scores in comprehension (English language arts) tests when they are led in Brain Gym® activities before class instruction and when they are taught using traditional teaching strategies?
- Research question # 2 Is there a difference between male and female students' scores in comprehension (English language arts) test when they are led in Brain Gym® activities before class instruction and when they are taught using traditional teaching strategies?
- Research question # 3 Is there a difference between students' scores in vocabulary (English language arts) tests when they are led in Brain Gym® activities before class instruction and when they are taught using traditional teaching strategies?

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Each research question was followed by a research hypothesis and a null hypothesis.

Research question 1 and 3 were analyzed using paired samples t-test procedures.

Research question 2 was analyzed using an independent samples t-test. The results for research question 1 yielded significant results $t(19) = 5.461$, $p = .001$, $ES = 1.13$. The results are displayed in Table 1. The results for research questions 2 and 3 were not significant.

Table 1

Paired t-test for teaching method and comprehension test score

Condition	M	SD	df	t-value	Sig. (2 tailed)	Effect Size
Traditional teaching	78.40	14.573	19	-5.461	.001	1.13
Brain Gym®	94.90	7.853				

Discussion

The purpose of this study was to examine the difference between students' scores in comprehension (English Language Arts) tests when they are led in Brain Gym® activities before class instruction and when they are taught using traditional teaching strategies. The first research question focused on the differences in comprehension test scores, where students were taught using traditional teaching strategies and implementing Brain Gym activities before instruction. The results indicated a significant difference in students' performance when taught using Brain Gym® activities before instruction and when using traditional methods. The students

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scored higher on their comprehension tests when they were taught using Brain Gym® activities before instruction than when they are not. The students' scores improved by 16.5 points after being led in Brain Gym® activities; a significant jump indicating that implementing Brain Gym® activities before instruction improves students' scores in comprehension.

During the time when the Brain Gym® activities were led before instruction, the students were excited and engaged with the exercises. These exercises got the students' hearts pumping which helped to keep their brain cells fully supplied with oxygen, nutrition and glucose. After being led in the Brain Gym® activities, the students had more receptors in their brain's neural network which makes for better mental processing. Thus, the students' comprehension scores were higher after they had been led in Brain Gym® activities before class instruction. This was consistent with Hannaford's findings in *Smart Moves* (Hannaford, 2005) and with Dennison's program that has seen rapid and often dramatic improvements in focus, comprehension, communication, organization and physical movement (Koester, 2012)

The second research question focused on gender differences in test scores, where students were taught using traditional teaching strategies and implementing Brain Gym® activities before instruction. The results indicated there was no significant difference between males and females and their comprehension test scores after being led in Brain Gym® activities before class instruction. I was surprised not to see a significant difference indicating the girls' scores were higher. Typically, girls verbal communication skills tend to be more advanced. However, the results could indicate both males and females were equally involved in the lesson; thus, no significant

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differences were shown. The boys and girls responded the same to the Brain Gym® activities before classroom instruction. It appears that Brain Gym® activities stimulate the same parts of the brain for both boys and girls that deal with comprehension.

The third research question focused on the differences in vocabulary test scores, where students were taught using traditional teaching strategies and implementing Brain Gym® activities before instruction. The results indicated there was no significant difference in the students' scores in vocabulary tests when they were led in Brain Gym® activities before instruction. I was surprised not to see significance in the results. Because of the great improvement shown in the scores of comprehension in research question one, I assumed the results would be similar. Most theorists and researchers in education have assumed that vocabulary knowledge and reading comprehension are closely related, and numerous studies have shown the strong correlation between the two (Baker, 1995; Nagy, 1988; Nelson-Herber, 1986).

Conclusions

The purpose of this study was to examine the difference between students' scores in comprehension (English Language Arts) tests when they are led in Brain Gym® activities before class instruction and when they are taught using traditional teaching strategies. A secondary purpose was to determine if there was a difference in gender and the two teaching methods of leading instruction. The results indicated a significant difference; students' scores in comprehension improved by 16.5 points after being led in Brain Gym® activities. In contrast, there was no significant difference between genders and their performance and no difference between Brain Gym® activities and vocabulary test scores.

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